OAK RIDGE NATIONAL LABORATORY

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To: Distribution
From: Therese K. Stovall
Subject: Additional DER Survey Data Analysis

Per a request from David Bassett, an additional analysis of the survey data reported by Electrotek as a part of the Phase I DER Benefits Study was completed and is reported here. If you have any questions, please let me know.

A survey was previously described in which the owners' reasons for installing Distributed Energy Resources were reported for 162 installations in the U.S.(see ORNL/TM-2001/290) However, among these 162 installations, 49 were demonstration units, usually fuel cells or microturbines. Another 33 installations contained incomplete information about either the type or size of the DG installation. This update shows the distribution of the survey results for the data set without these demonstration units, and the data set with both the demonstration and incomplete cases removed.

Two fuel cell cases remain in this data set. They are both situations with extreme environmental sensitivities, one in New York's Central Park and the other on an Indian Reservation. In both cases, remote (relative to the local grid) power needs with minimal environmental impact drove the technology selection. The five microturbine cases that remain in this data set are split almost evenly between utilities burning waste gas, and customers taking advantage of cogeneration economics and rate structure incentives. The remaining PV and wind sites represent situations remote from power lines (a cattle ranch) and utilities generating "green" power to meet market demands.

For the most restrictive data set, that with both the demonstration and incomplete cases removed, economic reasons were cited by 45%, environmental reasons by 16%, and meeting peak demands by 39%. Half the installations were owned by 'power' companies, either utilities, or third party energy supply companies. These power company installations represent about 2/3 of the installed capacity reported in this survey. A total of 32 installations cited reliability concerns as a reason for installation, and for 11 of these 32 installations, reliability was the ***only*** reason given. More than half of the customers are installing DER to reduce their "uncertainty" factor, defined here by a combination of reasons including reliability, price protection, and fuel flexibility; these add up to 43 out of 80 cases. Figures 1-7 summarize the results for this data set.

Cogeneration was the dominant reason given for installing DER in this survey. An examination of which DER technologies are used with cogeneration is shown in Fig. 7. It is interesting to note that the gas-fired reciprocating engines are just as likely to

provide cogeneration as the combustion turbines. These gas-fired reciprocating engines tended to be larger in capacity and to be owned by customers, compared to the diesel-fired reciprocating engines, which tended to be smaller in capacity and to be leased by utilities. The diesel-fired reciprocating engines, as well as the PV and wind installations, were least likely to employ cogeneration.

For the data set without demonstration cases, but which still contains those cases for which only partial information is available, please see Figures 8-13.

There are also several situations reported in the survey which don't translate well to graphs and charts. One utility is using DG to serve a short-term mining load. A communications company is placing DG at multiple sites to both provide back-up power and to serve as their main power source until the utility grid reaches their more remote sites. A chain of car washes and gas stations has installed small DG units and taken their loads off the grid completely. Another utility is contracting with existing back-up DER owners for control of their units to meet peak demands. Eleven universities are included in the data, all but one of which use cogeneration to meet their campus heating and/or cooling loads.

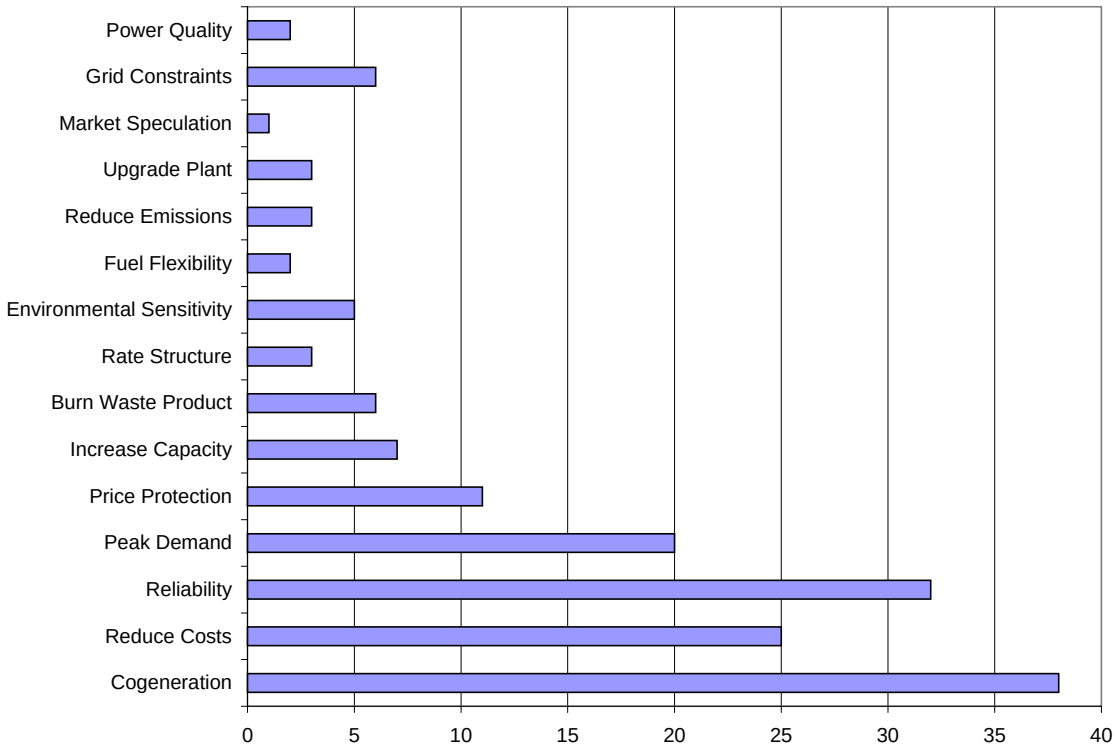

Figure 1 Number of cases citing each reason for their DG installation, demonstration and incomplete cases deleted.

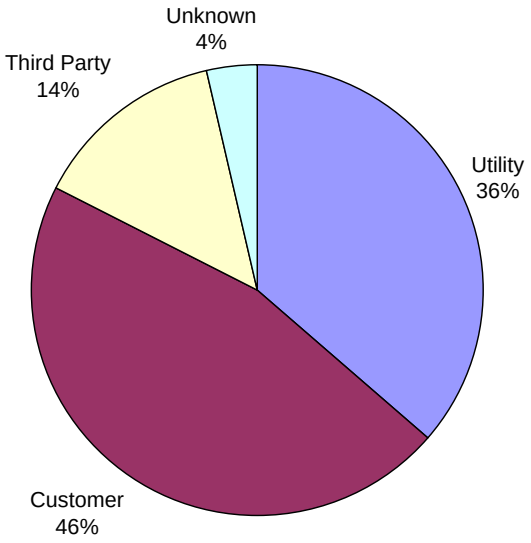

Figure 2 Type of ownership by number of installations, demonstration and incomplete cases deleted.

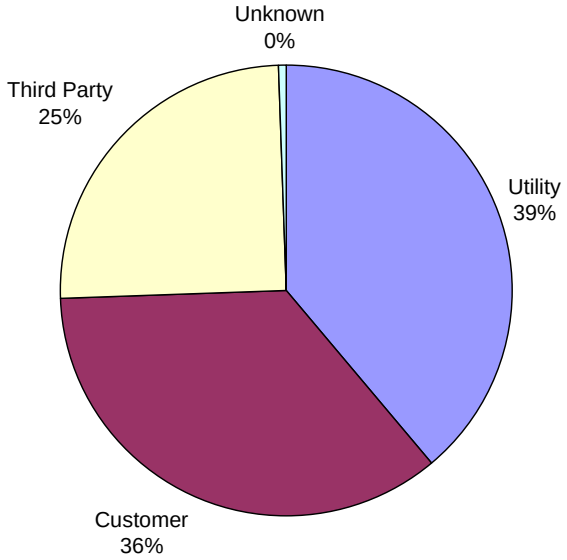

Figure 3 Type of ownership by installed capacity, demonstration and incomplete cases deleted.

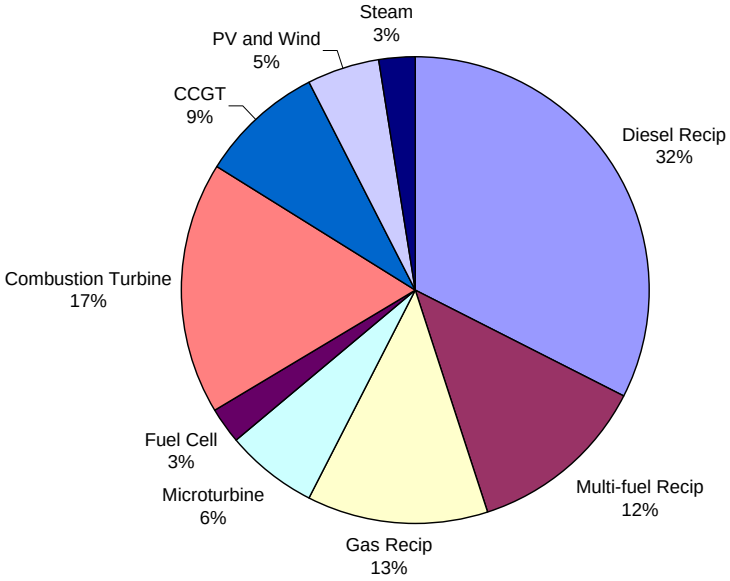

Figure 4 DER technology breakdown by the number of installations, demonstration and incomplete cases deleted.

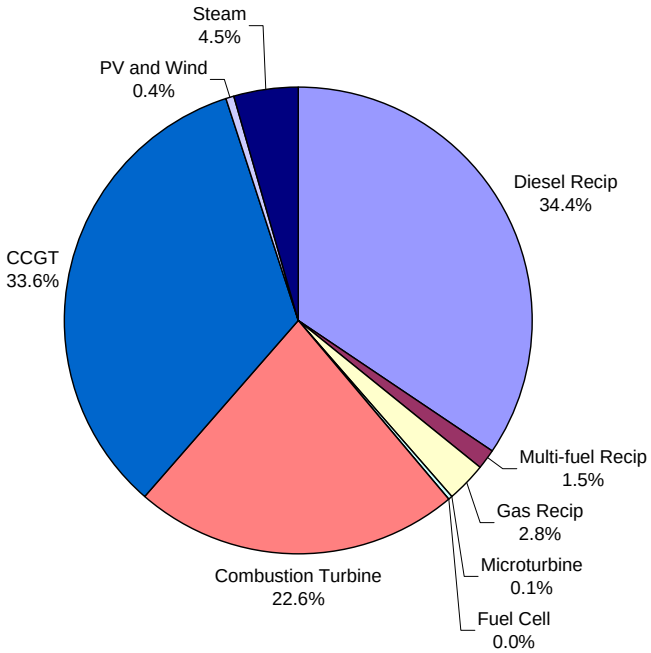

Figure 5 Distribution of DER technologies by installed capacity, demonstration and incomplete cases deleted.

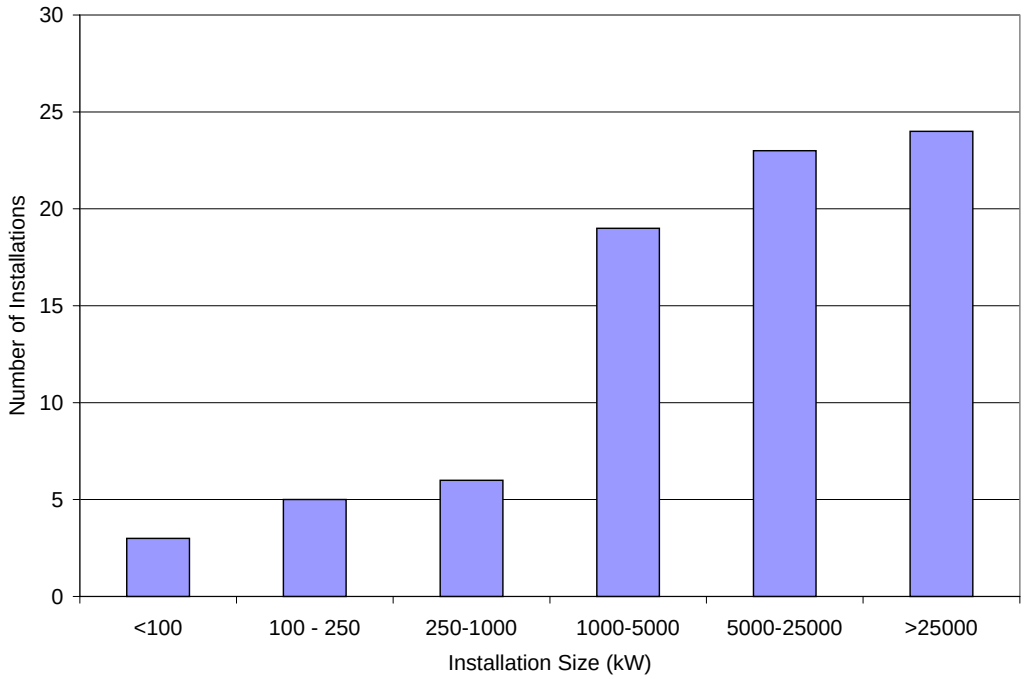

Figure 6 Number of installations per total DER installation electrical output, demonstration and incomplete cases deleted.

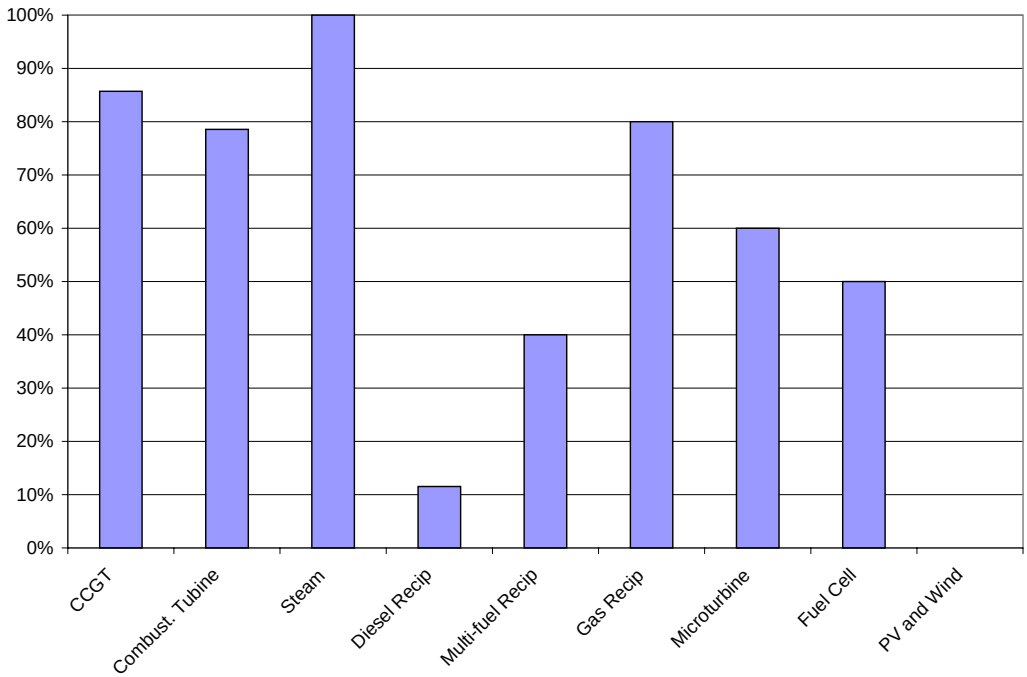

Figure 7 Portion of installations employing cogeneration for each technology type, demonstration and incomplete cases deleted.

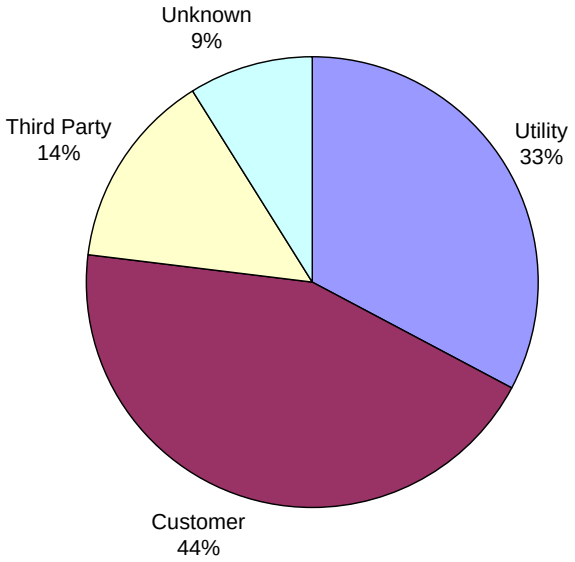

Figure 8 Type of ownership by number of installations, demonstration cases deleted.

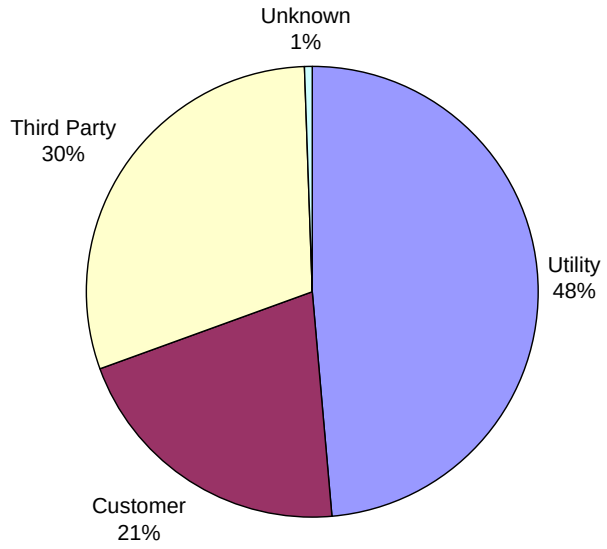

Figure 9 Type of ownership by installed capacity, demonstration cases deleted.

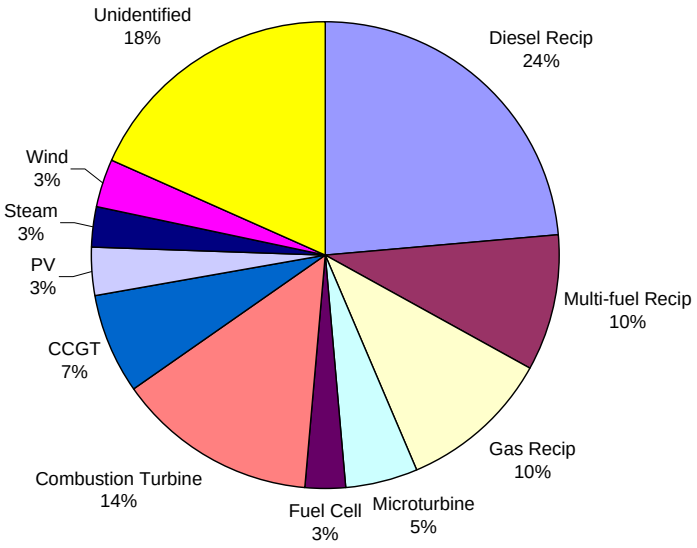

Figure 10 DER Technology by number of installations, demonstration cases deleted.

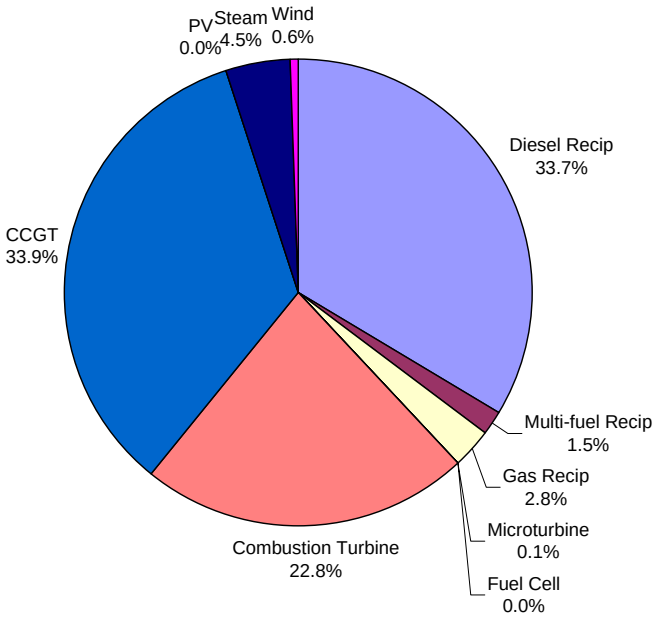

Figure 11 DER Technology breakdown by installed capacity, demonstration cases deleted.

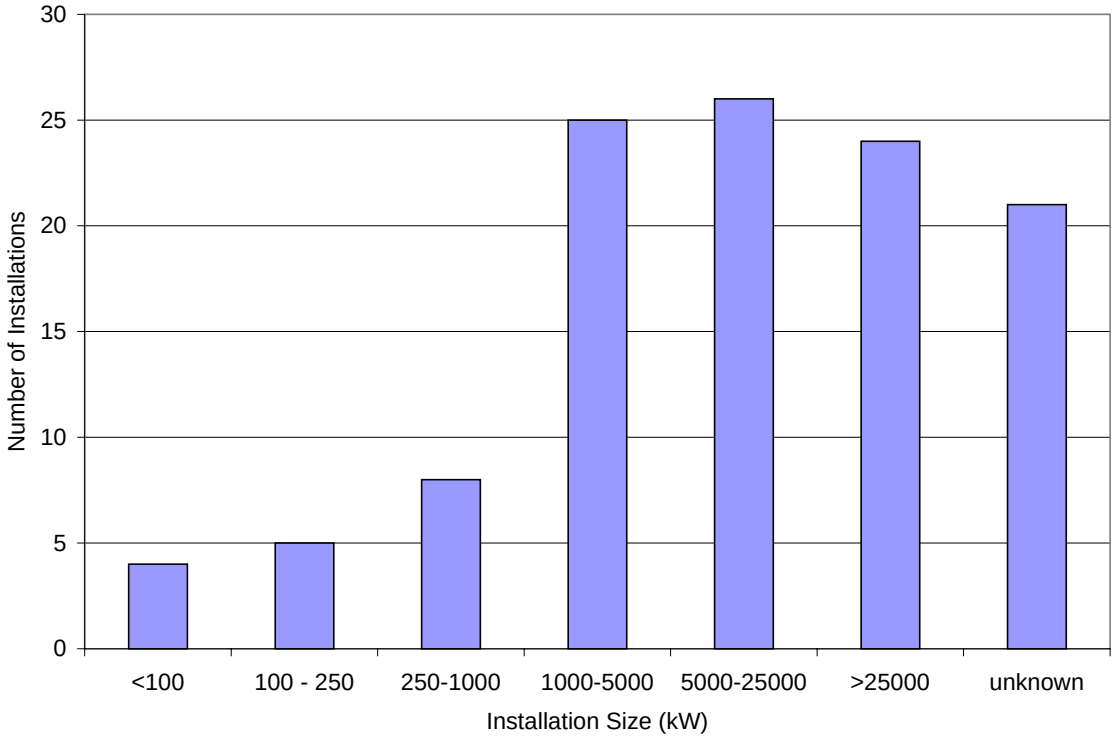

Figure 12 DER Installation size distribution, demonstration cases deleted.

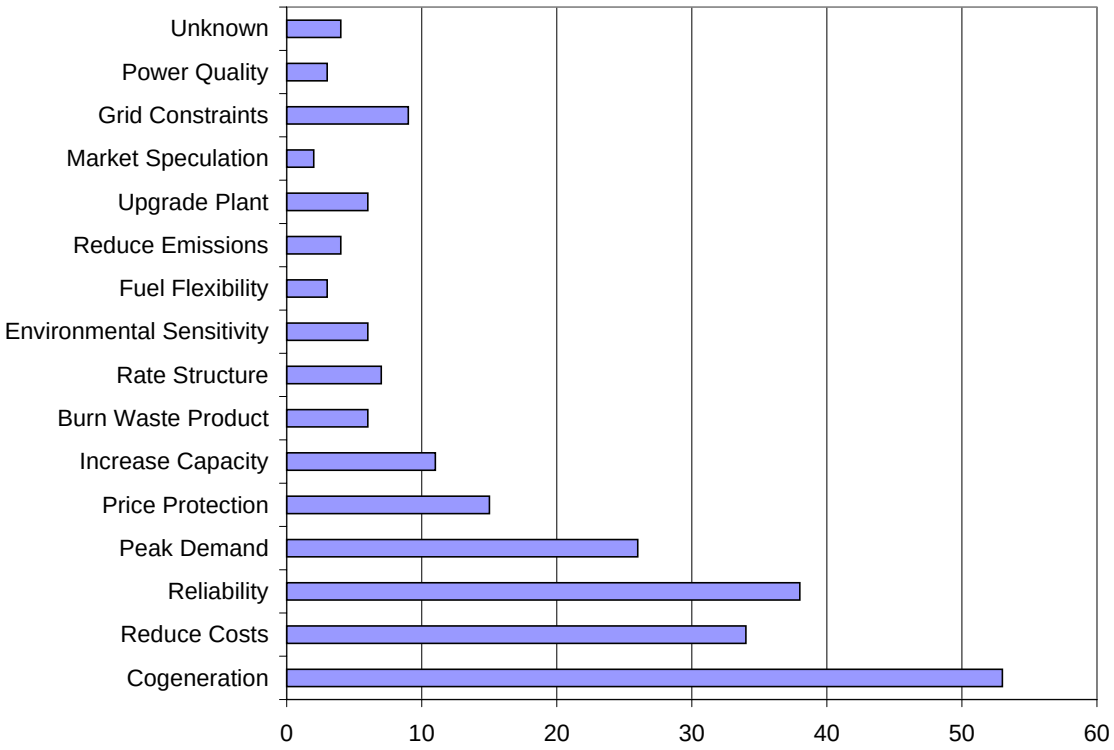

Figure 13 Reasons cited for installing DER, demonstration cases deleted.

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